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Original research article

Effects of trust and public participation on acceptability of renewable energy projects in the Netherlands and China

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ABSTRACT

In order to mitigate climate change and its impacts, it is crucial to replace fossil fuels with renewable energy sources. The extent to which renewable energy projects can be implemented largely depends on public acceptability. We studied how public acceptability is influenced by people's trust in agents responsible for renewable energy projects and the influence that people have over decisions regarding these projects. As expected, higher trust and having influence over major decisions regarding the project led to higher project acceptability. Public acceptability was lowest when people had low trust in responsible agents and when people could only influence minor decisions regarding the project. We found a similar pattern of results in our samples in the Netherlands and China, providing initial evidence that trust in responsible agents and public influence over decisions may have similar effects on public acceptability of renewable energy projects across different countries and cultures.

1. Introduction

In the Paris Agreement, countries across the world agreed to reduce their greenhouse gas emissions to mitigate climate change and its impacts [1]. To achieve this, it is crucial to reduce the use of fossil fuels, such as coal and gas, and use more renewable energy sources, such as solar and wind power [2]. Many governments have set ambitious targets to increase the share of renewables in their energy systems. For example, the Dutch government aims to increase its share of renewables to 14% (4.5% in 2013) of total energy consumption by 2020 [3], while China aims for a share of 15% (12% in 2015) by 2020 [4]. Yet, countries likely face many challenges to reach these goals.

One key challenge is public acceptability of renewable energy projects, namely the extent to which the public evaluates a renewable energy project favourably or unfavourably. Many renewable energy projects face public resistance, which can seriously inhibit the implementation of those projects [5–8]. This study aimed to further our understanding of what influences public acceptability of renewable energy projects. More specifically, we studied the extent to which (a) trust in agents who are responsible for renewable energy projects and (b) public influence over decisions regarding these projects influence public acceptability of these projects.

1.1. Trust in responsible agents and public influence over decisions

One key factor that is likely to influence public acceptability of renewable energy projects is trust in agents responsible for these projects, which reflects the extent to which the public evaluates the responsible agents as trustworthy (or not). Different agents can be involved in the transition to renewable energy sources, such as governments, energy companies and NGOs [9]. Usually, the public needs to rely on these agents, since often people do not initiate the project themselves and/or do not have the expertise and experience to fully understand and manage such a project. Accordingly, trust that these agents will implement and manage the projects in a good way seems critical for the acceptability of these projects [10]. Therefore, we propose that the more people trust responsible agents, the more favourably they will evaluate the relevant project.

There is evidence to suggest that trust in responsible agents is positively related to public acceptability of sustainable energy technology and renewable energy projects ([11,12], see for reviews [13–15]). Specifically, when people have higher trust in agents who are responsible for the development of renewable energy projects, people tend to evaluate these projects as more acceptable, making it likely that these projects can be implemented more smoothly [10]. In contrast, when people have lower trust in responsible agents, people tend to evaluate the projects as less acceptable [16]. However, as yet, the relationship between trust in responsible agents and public acceptability of renewable energy projects has mostly been examined in correlational studies that do not allow to tease apart the cause and effect in this relationship (e.g. [13,14]). For example, people may accept a project

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because they trust responsible agents, but conversely, people may also trust responsible agents *because* they find the project acceptable (cf. [17]). To address this gap in the literature, we use an experimental design in which we expose participants to the same renewable energy project and systematically vary the level of trust in responsible agents to test the effect of trust on public acceptability of the project.

Another important factor that could affect public acceptability of renewable energy projects is public influence over decisions regarding these projects. That is, the extent to which the public can participate in the decision-making process regarding the project and the extent to which their concerns will be incorporated into the decisions. Traditional top-down decide-announce-defend approaches are likely to be ineffective in increasing public acceptability or may even reduce acceptability, as the public feel their opinions and interests are not incorporated into the decisions [18], suggesting that involvement of the public in decision-making is important.

Indeed, it has been found that when people have at least some influence over decisions, they evaluate renewable energy projects as more acceptable compared to only being informed about the project [19–21]. For example, acceptability of a marine renewable energy project was enhanced when the fishermen were able to influence the decision-making, compared to top-down decision-making with little opportunity for the fishermen to influence decisions [20]. Interestingly, however, we know little about whether project acceptability can also depend on the type of decisions that people can influence, as current literature mainly focuses on whether the public has influence over decisions or not (e.g. [19–21]). Many different decisions are made in the development and implementation of renewable energy projects [22,23]. Some decisions pertain to minor issues, with small implications for the projects and society (further referred to as *minor decisions*; e.g., the specific design of renewable energy facilities), while other decisions pertain to major issues, with large implications for the projects and society (further referred to as *major decisions*; e.g., location of renewable energy facilities [6,7]). If we find that the type of decisions matters for project acceptability, this could be an impetus for considering early in the project where and how the public could have influence over decisions. Previous studies suggest that people care more about the major issues of renewable energy projects because these have more impact on their life and living environment compared to minor issues [6,7]. Hence, although being able to influence minor decisions means the public has some influence, people may not be satisfied with such influence because they may not care about the aspects they can influence. Therefore, we hypothesise that being able to influence major, rather than only minor decisions, regarding renewable energy projects leads to higher project acceptability. To test our reasoning, we systematically vary the influence that people have over different types of decisions in an experimental study and measure how this affects project acceptability.

To our best knowledge, our study is the first attempt to systematically and experimentally test the effects of both trust in responsible agents and public influence over decisions on public acceptability of renewable energy projects. Besides testing the main effects of these factors on project acceptability, it is critical to look at their interaction. On the one hand, for example, both high trust and influence over major decisions may be necessary to increase project acceptability. On the other hand, having one of them to be high may already increase project acceptability. One question is then whether having the other to be high has added value to project acceptability or not. Addressing this question is particularly important, since previous studies showed that trust in agents who are responsible for the development and implementation of energy projects, such as energy companies and the government, is often rather low [19,24,25]. Hence, it is crucial to know whether or not public influence over major decisions can enhance public acceptability of renewable energy projects, even when trust in responsible agents is low. Similarly, if trust in responsible agents is relatively high, the question is whether having influence over major decisions rather than only minor decisions would have any additional positive effect on public acceptability of renewable energy projects. For example, it could be that if trust is high, people may not be interested in having influence over major decisions since this would cost them time and effort. Moreover, sometimes major decisions have already been made, for example by the government; hence there is not much space for other responsible agents, such as energy companies, to give influence over major decisions to the public. It is therefore important to understand whether or not higher trust in the agent responsible for managing the project could increase project acceptability when people can only influence minor decisions.

1.2. Effects of trust and influence on acceptability in different countries and cultures

Another important question is to what extent trust in responsible agents and public influence over decisions regarding renewable energy projects influence public acceptability of these projects similarly in different countries and cultures. In other words, is our proposed theoretical model robust and can it be generalised to different countries and cultures? The robustness of the model is critical for international policy making, which would suggest that similar factors are important and hence could be targeted in interventions to increase project acceptability in different countries and cultures. As yet, most studies on public acceptability of renewable energy projects and factors driving public acceptability have been conducted in Western European countries and the US (e.g. [26,27]). Hence, the question remains whether similar findings can be found in other countries.

To address this question, we tested our reasoning in a Western European country, the Netherlands, and in an East-Asian country, China. We expected the model to be robust across the two countries because previous research suggests that both trust and influence over decisions may matter for project acceptability in each country. For example, both the Netherlands and China are characterised by mostly central governance of renewable energy projects, where important major decisions are mostly made by the government [27,28]. Therefore, people in the Netherlands and China may both be used to deferring to responsible agents to make decisions. Indeed, evidence suggests that trust in responsible agents is an important factor influencing project acceptability in both countries [13,29]. In addition, research suggests that both in the Netherlands and China public influence in decision-making can increase support for the projects [30,31]. Therefore, our proposed model may be robust across the two countries.

However, Dutch and Chinese cultures are also often considered quite different, with, for example, the first being individualistic [32] and the latter collectivistic [33]. These cultural factors might impact the (size of) the effects of trust and influence over decisions on project acceptability. For instance, research suggests that being able to influence major decisions may have a stronger effect on project acceptability in individualistic cultures, where people typically value expressing their opinions publicly and having influence over decisions that may possibly affect them [34]. In contrast, people in collectivistic cultures are less willing to express their personal opinions publicly [34]. In collectivistic countries, people particularly await the decisions from responsible agents, such as the government [33]. Yet, although there could be reasons to expect different (size of) effects of trust and influence on project acceptability in the two countries, we did not aim for comprehensive exploration of the cultural differences in this paper, but instead, to see to what extent our theoretical model is robust and generalizable across countries.

In sum, we tested the following hypotheses: (1) higher trust in responsible agents leads to higher public acceptability of renewable energy projects; (2) being able to influence major decisions regarding the project leads to higher project acceptability than only being able to influence minor decisions. We additionally studied the interaction effect of trust in responsible agents and public influence over decisions to examine whether or not both factors are necessary for increasing public

acceptability of renewable energy projects. Moreover, we tested our reasoning in two different countries and cultures, namely in the Netherlands and China.

2. Method

2.1. Procedures and design

We tested our reasoning in Groningen (Study 1) and in Zhangjiakou (Study 2), which are two medium-sized cities in the north of the Netherlands and China, respectively. Both cities have experience with renewable energy project development and are further developing new renewable energy projects in the near future. For example, both the Province of Groningen and Zhangjiakou City have developed solar and wind power projects. Therefore, we expected that people in Groningen and in Zhangjiakou could easily imagine that there were plans to develop a renewable energy project, in particular a solar panel project, in their neighbourhood.

In both cities, we selected different neighbourhoods for data collection. People were approached by the researcher or a trained volunteer at their homes in different neighbourhoods in Groningen and in Zhangjiakou, in order to reach people with different demographic characteristics. People were asked to participate in a study on their opinions about renewable energy projects. If they agreed to participate, they were handed the questionnaire[1], which was later picked up upon appointment. The questionnaire was in Dutch in Groningen and Chinese in Zhangjiakou.[2]

In both cities, we followed the same 2 × 2 between-subjects factorial design to test our hypotheses. Participants were asked to imagine that an energy company was planning to implement a solar panel project in their neighbourhood, and that they could give their opinions about the project together with other people in their neighbourhood. Next, we manipulated the level of trust in the energy company as well as whether people could influence major versus minor decisions regarding the project, as follows:[3]

2.1.1. Trust in the energy company[4]

In the low trust condition, participants read that based on their previous experience, they had low trust in the energy company that was responsible for the solar panel project. In the high trust condition, participants read that based on their previous experience, they had high trust in the energy company that was responsible for the solar panel project.

2.1.2. Public influence over decisions

In both the influence over minor decisions only condition and the influence over major decisions condition, participants had some influence, but the types of decisions they could influence differed. Specifically, in the influence over minor decisions only condition, we informed participants that during the decision-making about the solar panel project, they could only influence some aspects of the project, such as type and colour of the solar panels to be installed, while the number and the location of the solar panels had already been decided by the energy company. In the influence over major decisions condition, we informed participants that during the decision-making about the solar panel project, they could influence all aspects of the project, including the type, colour, the number and the location of the solar panels to be installed.

2.2. Measures

After reading the scenarios, we asked participants to evaluate the acceptability of the solar panel project.[5] They then answered manipulation check questions to determine whether our manipulations had the expected effects on trust in the responsible energy company and perceived influence over decisions regarding the solar panel project. Finally, participants answered some demographic questions (see Appendix B, Table B1 for detailed demographic information about the samples).

2.2.1. Acceptability of the solar panel project

We asked participants to what extent, on four 7-point scales (ranging from −3 to 3), they thought the solar panel project in their neighbourhood was: *very unacceptable* to *very acceptable*, *very bad* to *very good*, *very negative* to *very positive*, and *very unnecessary* to *very necessary*. We computed the mean scores on these four items, reflecting participants' acceptability of the project (the Netherlands: $M = 1.99$, $SD = 1.03$, $\alpha = 0.93$; China: $M = 2.12$, $SD = 0.86$, $\alpha = 0.97$)

2.3. Manipulation checks

2.3.1. Trust in the energy company

We asked participants to what extent, on three 7-point scales (ranging from −3 to 3), they thought the energy company that was going to implement the solar panel project in their neighbourhood was: *very unreliable* to *very reliable*, *very bad* to *very good*, and *very irresponsible* to *very responsible*. We computed the mean scores on these three items, reflecting participants' perceived trust in the energy company (the Netherlands: $M = 0.71$, $SD = 1.09$, $\alpha = 0.89$; China: $M = 1.37$, $SD = 1.45$, $\alpha = 0.98$).

2.3.2. Public influence over decisions

We asked participants to indicate their perception of (1) how much influence they themselves would have on decisions regarding the solar panel project and (2) how much influence people in their neighbourhood would have on these decisions. Scores could vary from 1 *very little* to 7 *very much*. We computed the mean score of the two items, reflecting participants' perceived influence over decisions regarding the solar panel project (the Netherlands: $M = 3.76$, $SD = 1.54$, $r = 0.80$; China: $M = 3.39$, $SD = 1.74$, $r = 0.62$).

3. Study 1: Effects of trust and public influence on acceptability of renewable energy projects in the Netherlands

3.1. Participants

In total 120 participants agreed to fill out the questionnaire, of which 95 were returned. A large part of the responses were missing in

[1] Questionnaire was distributed following a blind procedure. The researcher and the volunteers did not know which condition was presented to the participant.

[2] The questionnaire was first designed in English. Next, for the Dutch questionnaire, two native Dutch speakers translated it into Dutch. Two other native Dutch speakers checked the questionnaire and revisions were made as appropriate. For the Chinese questionnaire, a native Chinese speaker translated the English questionnaire into Chinese. Five other native Chinese speakers checked the questionnaire and revisions were made as appropriate.

[3] Before reading about the solar energy project, participants first completed a measure of their individual values [54] and of perceived values of people in their neighbourhood. Next, they evaluated acceptability of different energy sources, namely coal, gas, solar, wind, bio energy, geothermal energy, and nuclear power. All measures were included before the manipulation and were constant across the conditions. These measures are not relevant for the goals of this paper and will not be discussed further.

[4] See Appendix A for detailed scenario description including the manipulation of trust in the energy company and public influence over decisions.

[5] There were more questions following the scenario, including evaluation of the decision-making process and evaluation of decisions made by the energy company about the solar panel project. We do not report these results because they are outside the scope of this paper.

four questionnaires and were therefore excluded from the analyses, leaving 91 valid responses for further analyses. In total 45 respondents were male and 46 were female, with a mean age of 38 years (SD = 11.63). See Table B1 in Appendix B for detailed demographic information about the respondents in Groningen.

3.2. Results

3.2.1. Manipulation check

As expected, perceived trust was higher in the high trust condition (M = 1.05, SD = 0.98) than in the low trust condition (M = 0.35, SD = 1.10); t (89) = −3.22, p = 0.002. In addition, the extent to which participants thought that they themselves and their neighbours could influence the decisions regarding the solar panel project was higher when participants read that they could influence major decisions related to the project (M = 4.12, SD = 1.57) than when they could influence minor decisions only (M = 3.38, SD = 1.24); t (89) = −2.50, p = 0.014.

3.2.2. Effects of trust and influence over decisions on project acceptability

We used ANOVA to test our hypotheses.[6] We included the main effects of trust in the responsible energy company, public influence over decisions, and the interaction of trust and influence in the model. Results showed significant main effects of trust, F (1, 87) = 19.68, p < 0.001, η^2 = 0.18, and influence over decisions, F (1, 87) = 9.31, p = 0.003, η^2 = 0.10, on project acceptability. As predicted, participants in the high trust condition evaluated the project as more acceptable (M = 2.39, SD = 0.66) than participants in the low trust condition (M = 1.57, SD = 1.19). Also as predicted, when participants could influence major decisions regarding the project, they evaluated the project as more acceptable (M = 2.27, SD = 0.78) than when participants could only influence minor decisions regarding the project (M = 1.72, SD = 1.19).

The main effects of trust in the responsible energy company and public influence over decisions on project acceptability were qualified by a significant interaction of trust and influence (F (1, 87) = 10.23, p = 0.002, η^2 = 0.11). As depicted in Fig. 1, follow-up pairwise comparisons revealed that among the four experimental conditions, project acceptability was lowest when participants had low trust in the energy company and could only influence minor decisions regarding the solar panel project. Either having higher trust in the energy company or having influence over major decisions resulted in higher acceptability of the solar panel project to a similar extent, compared with the low trust and influence over minor decisions condition. Having both high trust in the energy company and influence over major decisions regarding the project did not have additional effects on the acceptability of the solar panel project in the Netherlands.[7]

3.3. Discussion

Study 1 showed that either having high trust in the responsible energy company or being able to influence major decisions regarding the solar panel project enhanced project acceptability in the Netherlands, a Western European country with an individualistic culture. Having both high trust and influence over major decisions did not have additional effects on project acceptability compared to having either high trust or influence over major decisions. Study 2 was aimed at testing whether we could replicate these findings in an East-Asian country with a collectivistic culture, namely China.

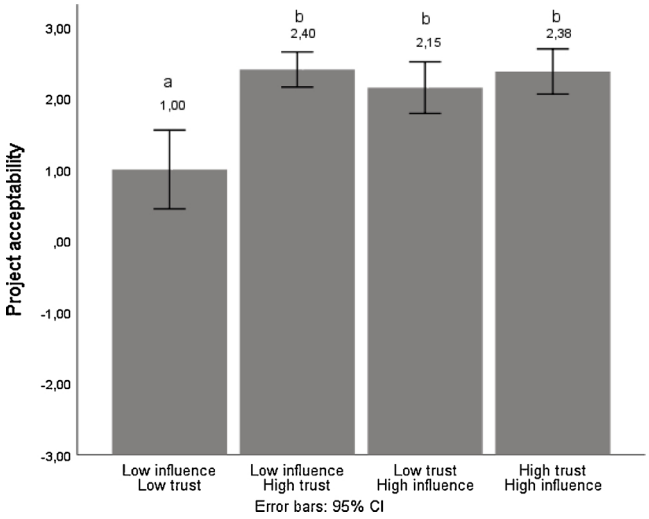

Fig. 1. Effects of trust in the responsible energy company and influence over decisions on project acceptability (Study 1).
Note: means of bars with different letters (a, b) significantly differ from each other (α < .05, Bonferroni-Holm corrected), those with the same letter do not significantly differ from each other.

4. Study 2: Effects of trust and public influence on acceptability of renewable energy projects in China

4.1. Participants

Again, in total 120 participants agreed to fill out the questionnaire, of which 103 were returned. A large part of the responses were missing in two questionnaires and were therefore excluded from the analyses, leaving 101 valid responses for further analyses. In total 26 respondents were male and 75 were female, with a mean age of 42 years (SD = 9.15). See Table B1 in Appendix B for detailed demographic

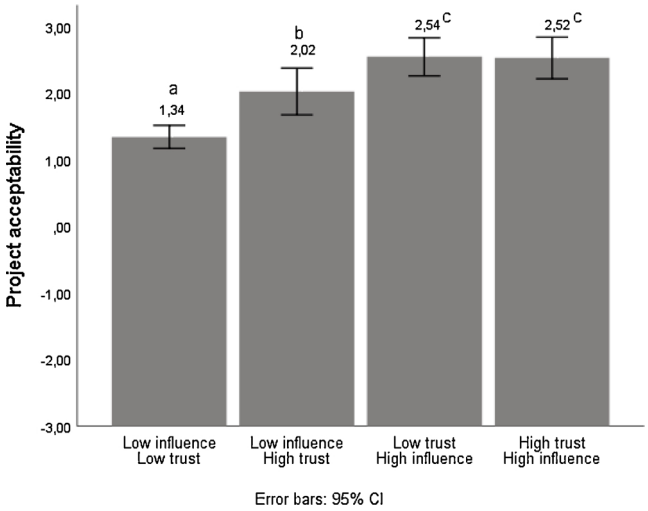

Fig. 2. Effects of trust in the responsible energy company and influence over decisions on project acceptability (Study 2).
Note: means of bars with different letters (a, b, c) significantly differ from each other (α < .05, Bonferroni-Holm corrected), those with the same letter do not significantly differ from each other.

[6] In addition to studying the effects separately for the two countries, we also conducted one ANOVA analysis with "country" as a between-subjects factor. This ANOVA analysis showed very similar results to what we found and reported in the paper based on the two separate analyses in the two countries, and yielded the same conclusions. As our aim was to replicate the study in different countries, rather than performing a comprehensive cross-country comparison, we report the results separately for the two countries.

[7] The pattern of the results did not change when we included gender, age, education, income and acceptability of solar energy as covariates. Therefore, we report the model results without including these as covariates.

information about the respondents in Zhangjiakou.

4.2. Results

4.2.1. Manipulation check

As expected, trust was higher in the high trust condition ($M = 1.71$, $SD = 1.06$) than the low trust condition ($M = 1.01$, $SD = 1.72$); $t(79) = -2.41$, $p = 0.018$. In addition, the extent to which participants thought that they themselves and their neighbours could influence the decisions regarding the solar panel project was higher when participants read that they could influence major decisions related to the project ($M = 3.72$, $SD = 1.64$) than when they could influence minor decisions only ($M = 3.06$, $SD = 1.44$); $t(99) = -2.16$, $p = 0.033$.

4.2.2. Effects of trust and influence over decisions on project acceptability

To replicate Study 1, we conducted an ANOVA, including the main effects of trust in the responsible energy company, public influence over decisions, and the interaction of trust and influence in the model. The results revealed significant main effects of trust, $F(1, 97) = 5.30$, $p = 0.023$,$\eta^2 = 0.05$, and influence over decisions, $F(1, 97) = 35.01$, $p < 0.001$, $\eta^2 = 0.27$, on project acceptability. Similar to Study 1 and as predicted, participants in the high trust condition evaluated the project as more acceptable ($M = 2.25$, $SD = 0.86$) than participants in the low trust condition ($M = 1.98$, $SD = 0.84$). Also in-line with Study 1 and as predicted, participants who read they could influence major decisions regarding the project ($M = 2.53$, $SD = 0.72$) evaluated the project as more acceptable than participants who believed they could only influence minor decisions regarding the project ($M = 1.71$, $SD = 0.79$).

Again, the main effects of trust in the responsible energy company and public influence over decisions on project acceptability were qualified by a significant interaction of trust and influence ($F(1, 97) = 5.88$, $p = 0.017$, $\eta^2 = 0.06$). Follow-up pairwise comparisons showed that the effects of trust in the responsible energy company and public influence over decisions on project acceptability followed a similar pattern as in Study 1 (Fig. 2). Again, among the four experimental conditions, project acceptability was lowest when participants had low trust in the responsible energy company and could only influence minor decisions of the solar panel project. When people could influence only minor decisions, having higher trust in the responsible energy company resulted in higher project acceptability. Interestingly, acceptability was even higher when people had influence over major decisions, irrespective of the level of trust that people had in the responsible energy company in China.[8]

4.3. Discussion

Results of Study 2 were mostly similar to the results of Study 1, indicating that trust in responsible agents and public influence over decisions played similar roles in affecting public acceptability of renewable energy projects in the Netherlands and China. In China, having influence over major decisions regarding the project resulted in highest project acceptability, even when trust that people had in the responsible energy company was low.

5. General discussion and conclusion

We studied the effects of trust in responsible agents and public influence over decisions on public acceptability of renewable energy projects, specifically a solar energy project, in the Netherlands and China. We extended previous research by (1) conducting an experimental study to test the causal effects of trust in responsible agents and influence over decisions regarding the project on public acceptability of renewable energy projects; (2) testing the combined effects of trust and influence over decisions on project acceptability; and (3) testing whether the effects of trust and influence over decisions on project acceptability are similar across different countries and cultures, notably the Netherlands, a Western European and individualistic country, and China, an East-Asian and collectivistic country.

We consistently found that public acceptability of the planned solar energy project was lowest when trust in the energy company responsible for the solar energy project was low and participants could only influence minor decisions regarding the project. In addition, our results demonstrated that having *either* higher trust in the responsible energy company *or* influence over major decisions regarding the project increased public acceptability of the project, in both our samples in the Netherlands and China, suggesting that the results are likely to be generalizable across different countries and cultures.

These findings provide important convergent evidence in addition to earlier correlational studies on the positive relationship between trust and project acceptability (e.g. [13–15]). Our experimental study adds to this literature by causally establishing that trust in responsible agents influences project acceptability. More importantly, we extended previous research by also examining the combined effects of trust and public influence over decisions, as theory on factors driving project acceptability mostly examine these factors separately. This provides important insights into whether or not different factors need to be in place simultaneously to enhance project acceptability. Furthermore, we conducted the same study in two different countries and cultures, providing first evidence that similar processes may play a role in influencing project acceptability in different countries and cultures.

Although both trust and influence over decisions had positive effects on project acceptability across our samples in the two countries, the strength of the effects of trust and influence over decisions on project acceptability was slightly different in our samples within the Netherlands and China. For our Dutch sample, the positive effect of trust in the responsible energy company on project acceptability ($\eta^2 = 0.18$) was stronger than the effect of public influence over decisions on project acceptability ($\eta^2 = 0.10$). For our Chinese sample, it was the other way around – the effect of public influence over decisions on project acceptability ($\eta^2 = 0.27$) was stronger than the effect of trust in the responsible energy company on project acceptability ($\eta^2 = 0.05$). Perhaps in the Netherlands people prefer having someone they trust to make decisions for them, as this implies that they can spend less time and effort on public participation procedures [35–37]. The stronger effect of influence in our Chinese sample could be related to the increased opportunities to influence decision-making nowadays compared to the past; for example, as a result of social media development in China, people may thus treasure these opportunities and perceive influence to be very important (cf. [38–40]). Also, in China, energy projects are usually initiated by the government and therefore trust in an energy company could be less relevant in the planning phase. This suggests trust in the government could potentially be more relevant for public acceptability of newly developed renewable energy projects in China [28]. Future studies could test the effects of trust in different agents who are responsible for renewable energy projects in China and other countries. Most importantly, in both countries, higher trust and influence over decisions resulted in higher project acceptability, although effect sizes for trust were stronger in the Netherlands than in China, while influence over decisions had a stronger effect size in China than in the Netherlands.

Our findings have important practical implications. Our results suggest that both trust in responsible agents and public influence over decisions regarding renewable energy projects should be considered from the very beginning of the development of these projects. Firstly, since trust is an important factor for project acceptability, if initial trust is high, it is important to keep trust in responsible agents high, and otherwise to increase trust in case when it is initially low. Secondly, it is generally believed that increasing public participation in decision-making processes is an effective way to secure public acceptability of climate policies and sustainable projects ([41,42], see for review). Yet,

[8] The pattern of the results did not change when we included gender, age, education, income and acceptability of solar energy as covariates. Therefore, we report the model results without including these as covariates.

our results showed that engaging the public in major decisions regarding the project resulted in higher public support for renewable energy projects compared to only engaging them in minor decisions. Practitioners should consider ways that can truly engage people in influencing major decisions regarding the project. Thirdly, given that trust in agents responsible for renewable energy development may not always be high [19,24,25] and particularly given that it may be difficult to enhance trust in responsible agents in a short term [24], it seems particularly important to give people a say in major decisions regarding renewable energy projects. This may not only improve public acceptability of the project as such, but engaging people in decision-making could, in many cases, lead to better decisions and improve the quality of projects by incorporating local knowledge in the development of projects ([43]; cf [44]). Giving the public a say in major decisions regarding renewable energy projects could eventually even increase people's trust in responsible agents (cf [45]). Specifically, being able to influence major decisions could make the public think that the responsible agent is transparent about its activities and is willing to consider public interests when making decisions. Future research could test this possibility.

Future research could also test under which conditions trust and public influence over decisions have most positive effects on project acceptability. For example, it could be examined whether the different types of public participation, ranging from informing the public to citizen control over decision-making, affect project acceptability differently [46]. Participation forms that involve stronger public involvement in decision-making might be more likely to have positive effects on project acceptability than only providing information [19–21]. Also, we conceptualized trust as the extent to which the public evaluates agents who are responsible for making decisions and carrying out actions regarding renewable energy projects as trustworthy. Yet, different dimensions of trust have been distinguished in the literature, including integrity-based trust (the extent to which the public perceives responsible agents to be honest and open) and competence-based trust (the extent to which people think responsible agents have sufficient expertise and knowledge to manage the project) [47–51]. Future (experimental) studies could examine how these different dimensions of trust influence public acceptability of renewable energy projects.

At this stage of model testing, we purposely manipulated trust in responsible agents and public influence over decisions in an explicit way, to see whether the differences in project acceptability would occur as predicted by the model. Future research could manipulate both factors differently and more implicitly to further test our reasoning. For example, trust could be manipulated based on relevant characteristics of the responsible agent, such as honesty, transparency about activities and the extent to which the responsible agent care about public interests. Also, the type of decisions that the public can influence could be embedded in detailed description of different decisions, instead of informing participants explicitly that they could influence "some" versus "all" decisions. This also leads to an interesting question for future research to test whether different types of framing of influence over decisions would have an effect on project acceptability or not. Moreover, we did not include a control condition in this study because we were mainly interested in the effects of trust and influence over decisions on project acceptability, rather than investigating whether we could alter a current situation. Future research could conduct the study with a control condition to further examine whether lower levels of trust/influence reduce acceptability, or it could be that higher levels of trust/influence increase project acceptability. This would be an interesting research question to see where interventions should focus on.

Interestingly, public acceptability of the solar panel project evaluated in our study was relatively high in both countries across all conditions, which may be related to the generally positive association that people have with solar power [52]. We chose to base our scenario on a solar power project because many communities may expect such a project in their neighbourhood in the future. Moreover, rather than focusing on a specific energy technology, our aim was to test the theoretical model on the effects of trust and influence over decisions on project acceptability. Future research could test whether similar results are found when studying more controversial renewable energy projects, such as wind power projects, or hydro-energy projects [6,8,53]. Maybe when project acceptability is generally lower, having only high trust or influence over major decisions regarding the project is not sufficient to increase project acceptability – in such cases, both may be needed for higher project acceptability. Moreover, our results were based on a scenario study, which did not concern a real decision. It would be interesting for future research to test the model in field studies: analysing the relationships between trust in responsible agents and (perceived) influence over decisions, on the one hand, and public acceptability of the actual renewable energy projects, on the other hand.

Our participants were real households who may expect renewable energy projects in/near their neighbourhoods in the future. Yet, one possible limitation of our samples was that they were not representative samples of the two cities we studied. For example, the sample in Groningen was not diverse in terms of education and income, while the sample in Zhangjiakou had more female than male. Yet, it was not our aim to get representative samples in both cities to conduct a comprehensive cross-cultural comparison. Our main goal of this paper was to examine the robustness of the model, which we examined by testing the model in two medium sized cities that could expect renewable energy projects in the future in the Netherlands and China. Future research could examine whether consistent findings can be found in different cities or rural areas in both countries, or with representative samples of the Dutch and Chinese population, to draw firmer conclusions about the generalizability of the findings. In addition, future research is needed to investigate the possibility that trust and influence could have different effect (sizes) in both countries with representative samples and/or in other countries and cultures.

To conclude, this paper is the first attempt to experimentally study the effects of trust in responsible agents and public influence over decisions on public acceptability of renewable energy projects. Although there were some small differences in strength of effects, the pattern of results was mostly similar in the Netherlands and China. Therefore, our paper provides first experimental evidence that trust in responsible agents and public influence over decisions may have similar effects on project acceptability across different countries and cultures. Importantly, having either higher trust in the responsible agent or influence over major decisions could be sufficient for higher project acceptability. This suggests that international policies aiming at implementing renewable energy projects that are widely supported by the public should particularly take into account trust in responsible agents and facilitate public influence over major decisions related to such projects, in order to promote a worldwide sustainable energy transition.

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Appendix A. Scenarios with manipulations of trust in the responsible energy company and public influence over decisions[9]

Low influence & Low trust

Please imagine that an energy company was planning to implement a solar panel project in your neighbourhood. Together with other people in

[9] Dutch and Chinese translations of the scenarios are available upon request of the first author.

your neighbourhood, you can give your opinions about the project. During the decision-making about the solar panel project, you and your neighbours can only influence some aspects of the project, such as type and colour of the solar panels to be installed. The number and the location of the solar panels have already been decided by the energy company. Based on your previous experience, you have low trust in this energy company.

Low influence & high trust

Please imagine that an energy company was planning to implement a solar panel project in your neighbourhood. Together with other people in your neighbourhood, you can give your opinions about the project. During the decision-making about the solar panel project, you and your neighbours can only influence some aspects of the project, such as type and colour of the solar panels to be installed. The number and the location of the solar panels have already been decided by the energy company. Based on your previous experience, you have high trust in this energy company.

High influence & low trust

Please imagine that an energy company was planning to implement a solar panel project in your neighbourhood. Together with other people in your neighbourhood, you can give your opinions about the project. During the decision-making about the solar panel project, you and your neighbours can influence all aspects of the project, including the type, colour, the number and the location of the solar panels to be installed. Based on your previous experience, you have low trust in this energy company.

High influence & high trust

Please imagine that an energy company was planning to implement a solar panel project in your neighbourhood. Together with other people in your neighbourhood, you can give your opinions about the project. During the decision-making about the solar panel project, you and your neighbours can influence all aspects of the project, including the type, colour, the number and the location of the solar panels to be installed. Based on your previous experience, you have high trust in this energy company.

Appendix B

Table B1
Demographics of respondents in Groningen and Zhangjiakou.

		Groningen, the Netherlands	Zhangjiakou, China
Gender	Male	45	26
	Female	46	75
Mean age (*SD*)		38 (*SD* = 11.63)	42 (*SD* = 9.15)
Education	Primary school	0	2
	Junior school	0	14
	High school	22	33
	University	68	48
	Don't want to say	1	4
Income per month (Euro/Yuan) (1 euro equals about 7.8 Yuan)	Less than 1500	49	8
	1500–3000	28	19
	3001–4500	4	16
	More than 4500	2	27
	Don't want to say	8	31
Living situation	Owner	15	89
	Tenant	76	7
	Other	0	5

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